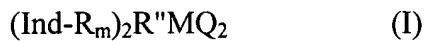


## AMENDMENTS TO THE CLAIMS

### Claims 1-25 (Cancelled)

26. (New) A method for the production of a polypropylene comprising branches in the polymer backbone, comprising:

(a) forming macromers from an olefin monomer in the presence of a metallocene catalyst which promotes a chain terminating  $\beta$ -alkyl elimination reaction to form terminal unsaturated groups in the macromers and is characterized by the formula:



wherein:

Ind is an indenyl group or a tetrahydroindenyl group;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

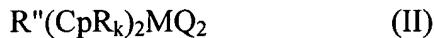
m is an integer from 0-6;

R'' is a structural bridge imparting stereorrigidity to the catalyst and containing at most one carbon atom;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

or by the formula:



wherein:

Cp is a cyclopentadienyl ring;

R'' is a structural bridge imparting stereorrigidity to the catalyst and contains no more than one carbon atom;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

k is an integer of from 1-4;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

and

(b) polymerizing propylene in the presence of the macromers and a catalyst under polymerizing conditions which favor the incorporation of the macromers into the polypropylene backbone to form a branched polypropylene.

27. (New) The method of claim 26 wherein said metallocene catalyst is characterized by formula (I) and has a symmetrical substitution pattern in which both Ind groups are mono-substituted in position 3.

28. (New) The method of claim 27 wherein the substituent on each Ind group is a bulky substituent.

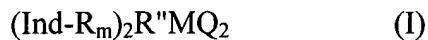
29. (New) The method of claim 28 wherein the bulky substituent is selected from an isopropyl group, a tertiary butyl group and a trimethylsilyl (TMS) group.

30. (New) The method of claim 26 wherein the metallocene catalyst is characterized by formula (II) and has a symmetrical substitution pattern in which both Cp groups are mono-substituted in position 3.

31. (New) The method of claim 30 wherein the substituent on each cyclopentadienyl group is a bulky substituent.

32. (New) The method of claim 31 wherein the bulky substituent is selected from an isopropyl group, a tertiary butyl group and a trimethylsilyl (TMS) group.

33. (New) The method of claim 26 wherein the catalyst recited in subparagraph (b) comprises a metallocene catalyst characterized by the following formulas (I)-(V):



wherein:

Ind is an indenyl group or a tetrahydroindenyl group;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

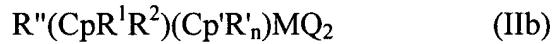
m is an integer from 0-6;

R'' is a structural bridge imparting stereorrigidity to the catalyst;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

or by the formula:



wherein:

Cp is a cyclopentadienyl ring;

Cp' is a fluorenyl ring;

R'' is a structural bridge imparting stereorrigidity to the catalyst;

R<sup>1</sup> is a substituent on the cyclopentadienyl ring which is distal to the bridge, which distal substituent comprises a bulky group of the formula XR\*<sub>3</sub> in which X is an atom from Group IVA and R\* is the same or different and is chosen from a hydrogen or a hydrocarbyl group having from 1-20 carbon atoms;

$R^2$  is a substituent on the cyclopentadienyl ring which is proximal to the bridge and positioned non-vicinal to the distal substituent and is of the formula  $YR\#_3$  in which Y is an atom from Group IVA, and each  $R\#$  is the same or different and is chosen from a hydrogen or a hydrocarbyl group having from 1-7 carbon atoms;

each  $R'$  is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

n is an integer of from 0-8;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

or by the formula:



wherein:

Cp is a substituted or unsubstituted cyclopentadienyl ring;

Cp' is a substituted or unsubstituted fluorenyl ring;

$R''$  is a structural bridge imparting stereorigidity to the component;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

each  $R'$  is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

m is an integer of from 0-4;

r is an integer from 0-8;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

or by the formula:



wherein:

Cp is a substituted cyclopentadienyl ring;

Cp' is a substituted or unsubstituted fluorenyl ring;

R'' is a structural bridge imparting stereorigidity to the component;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

each R' is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

x and y are independently an integer of from 0-4 and 0-8, respectively;

M is a metal atom from Group IVB or is vanadium;

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; and

wherein the CpR<sub>x</sub> group lacks bilateral symmetry;

or by the formula:



wherein:

Cp is a substituted cyclopentadienyl ring or a substituted or unsubstituted fluorenyl ring;

R'' is a structural bridge between Cp and X imparting stereorigidity to the component;

each R is the same or different and is selected from a hydrocarbyl group having from 1-20 carbon atoms, a halogen, an alkoxy group, an alkoxyalkyl group, an alkylamino group or an alkylsilylo group;

when Cp is a cyclopentadienyl ring, q is an integer from 0-4;

when Cp is a fluorenyl ring, q is an integer from 0-8;

X is a heteroatom from Group VA or Group VIA and may be substituted or unsubstituted;

M is a metal atom from Group IIIB, IVB, VB or VIB in any of its theoretical oxidation states;

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; and wherein the bilateral symmetry of the CpR<sub>q</sub> group is maintained.

34. (New) The method of claim 33 wherein the metallocene catalyst of subparagraph (b) is characterized by the formula (IV) and the group CpR<sub>x</sub> is substituted with R at the 3-position.

35. (New) The method of claim 33 wherein the metallocene catalyst of subparagraph (b) is characterized by the formula (V) and the group CpR<sub>q</sub> is symmetrically substituted with R at the 3-position.

36. (New) The method according to claim 33 wherein M is Ti, Zr or Hf.

37. (New) The method of claim 36 wherein Q is Cl.

38. (New) The method of claim 26 wherein R" is a Me<sub>2</sub>C, H<sub>2</sub>C or a Ph<sub>2</sub>C group.

39. (New) The method of claim 26 wherein the macromers formed in subparagraph (a) are formed in the presence of ethylene to promote the formation of terminal ethylenyl groups in the macromers.

40. (New) The method of claim 26 wherein the olefin monomer employed in forming the macromers comprises propylene.

41. **(New)** The method of claim 40 wherein the operations of subparagraphs (a) and (b) are carried out in the same reaction zone and wherein the catalysts of subparagraphs (a) and (b) are supported catalysts.

42. **(New)** The method of claim 26 wherein the olefin monomer for forming the macromers comprises ethylene or a C<sub>4+</sub> olefin.

43. **(New)** The method of claim 42 wherein the olefin monomer for forming the macromers is selected from the group consisting of ethylene, butene, pentene, hexene and mixtures thereof.

44. **(New)** The method of claim 26 wherein the macromers formed in accordance with subparagraph (a) are formed in a first reaction zone and the polymerization of propylene in the presence of said macromers in accordance with subparagraph (b) is carried out in a second reaction zone, separate from the first reaction zone.

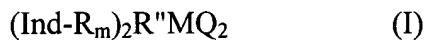
45. **(New)** The method of claim 44 wherein said second reaction zone is connected in series with said first reaction zone downstream of said first reaction zone.

46. **(New)** The method of claim 26 wherein the polymerization procedure of subparagraph (b) is carried out at a temperature of at least 100 °C.

47. **(New)** The method of claim 26 wherein the polymerization procedure of subparagraph (b) is carried out in a hydrogen-free atmosphere.

48. (New) A branched polypropylene having branches in the polymer backbone produced by the process of:

(a) forming macromers from an olefin monomer in the presence of a metallocene catalyst which promotes a chain terminating  $\beta$ -alkyl elimination reaction to form terminal unsaturated groups in the macromers and is characterized by the formula:



wherein:

Ind is an indenyl group or a tetrahydroindenyl group;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

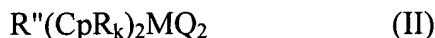
m is an integer from 0-6;

$R''$  is a structural bridge imparting stereorrigidity to the catalyst and containing at most one carbon atom;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

or by the formula:



wherein:

Cp is a cyclopentadienyl ring;

$R''$  is a structural bridge imparting stereorrigidity to the catalyst and contains no more than one carbon atom;

each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms;

k is an integer of from 1-4;

M is a metal atom from Group IVB or is vanadium; and

each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

and

(b) polymerizing propylene in the presence of the macromers and a catalyst under polymerizing conditions which favor the incorporation of the macromers into the polypropylene backbone to form a branched polypropylene.

49. **(New)** The branched polypropylene of claim 48 which comprises a branched isotactic polypropylene.